

REMARKS

This amendment is responsive to the Office Action of December 3, 2003. Applicants ask for reconsideration and allowance of claims 1-9 and 19-27 as set forth herein.

The Office Action

The Office Action of Dec. 3, 2003 withdraws the previous allowability of claims 11, 14, and 18-22 in view of new references Johnson (U.S. patent no. 3,774,021, hereinafter "Johnson") and Wu (U.S. patent no. 6,036,336, hereinafter "Wu"). These new references were apparently discovered by a new search performed after issuance of the Jan. 24, 2003 Office Action. Accordingly, the Dec. 3, 2003 Office Action is a non-final action.

In the Dec. 3rd Office Action, all claims now stand rejected under 35 U.S.C. § 103(a) as unpatentable over FIGURE 1 of the present application (labeled as "Prior Art" therein) in combination with other references. Specifically:

Claims 1-9 stand rejected as being unpatentable over FIGURE 1 in view of Zhang (U.S. published application 2002/0021573A1, hereinafter "Zhang") in further view of the new reference Johnson.

Claims 11-17 and 23-25 stand rejected as being unpatentable over FIGURE 1 in view of Terlap (U.S. patent no. 5,594,433) in further view of Zhang.

Claim 18 stands rejected as being unpatentable over FIGURE 1 in view of Terlep in further view of Zhang in further view of new reference Wu.

Claim 19-22 stand rejected as being unpatentable over FIGURE 1 in view of Zhang.

Claims 1-5, 26, and 27 Distinguish Over the References of Record

Claim 1 was amended in previous Amendment A to call for "the optical element being partially reflective and partially transmissive." This subject matter was taken from claim 11, which was indicated in the Jan. 24th Office Action as containing allowable subject matter. In the present Dec. 3rd Office Action, this subject matter now stands rejected as unpatentable under 35 U.S.C. § 103(a) based on newly identified reference Johnson in combination with Zhang and Applicant's FIGURE 1.

In response, Applicants further amend claim 1 herein to specify that both the partially transmitted and the partially reflected light contribute to the light output of the traffic signal

ball, and to specify that the optical system is a collimating reflector. Applicants submit that these amendments more clearly distinguish claim 1 over the references of record.

Johnson discloses an optical element (the dome encapsulant 17) which is partially light transmissive. See Johnson at col. 2 lines 24-29. However, to reject a claim as unpatentable under 35 U.S.C. § 103(a) using multiple references, it is necessary to (i) identify every element in the claim in the references; and (ii) identify motivation for combining based on the references. "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." MPEP § 2143.01 (underscore in original).

There is no motivation or fair suggestion in the cited references to provide a partially light transmissive optical element. Indeed, Johnson teaches entirely to the contrary, stating: "The objective of this dome design is to minimize loss of light through this surface." Johnson at col. 2 lines 26-27 (underscore added). Referring to Johnson Fig. 4, which shows the light guide forming the telephone faceplate, the goal is to guide light laterally in the plane of the faceplate to the telephone buttons, such as to button "2" labeled by reference number 24. See Johnson at col. 3 line 48-col. 4 line 10. Any light transmitted through the dome 17 would appear as a false indication of an extra illuminated button on the faceplate, which is completely contrary to the objective of Johnson.

"The prior art reference must be considered in its entirety, i.e. as a whole, including portions that would lead away from the claimed invention." MPEP § 2141.02 (underscore in original). One skilled in the art would not be motivated by Johnson to use an optical element that is partially reflective and partially transmissive in a traffic light ball. Rather, one skilled in the art would be strongly motivated by Johnson to use an optical element that is entirely light reflective, with light transmission minimized and preferably eliminated entirely.

To emphasize this distinction, Applicants have amended claim 1 to specify that both partially transmitted and the partially reflected light contribute to the light output of the traffic signal. In contrast, transmitted light in Johnson is undesirable and preferably eliminated.

Regarding FIGURE 1 of the present application, the Office Action notes that this illustration of a prior art traffic light ball employing an incandescent lamp has an optical system receiving light from the incandescent lamp. This is most certainly true; however, it is

entirely different from what the rejected language of claim 1 called for. Rather, that language called for an optical system that receives light dispersed by the optical element.

Applicants have amended claim 1 to replace "optical system" with "collimating reflector." The amended claim specifies that the optical element (not the LEDs; compare with prior art FIGURE 1) is disposed at about the reflector focus such that the dispersed light is substantially collimated by the collimating reflector to define a reflected light contribution to the light output. Zhang discloses a plastic cover 2, which may be diffused; however, nowhere does Zhang suggest that light diffused by the cover be collimated by a reflector. Indeed, since the diffused cover 2 extends across the entire face of the traffic light ball, it is far too large to be "disposed at about the reflector focus" as called for in claim 1. Since a collimating reflector collimates light emanating from at or near the reflector focus, the plastic cover 2 cannot produce diffused light that is collimated by a collimating reflector.

Claim 1 distinguishes over the proposed combination of references. The proposed combination of Zhang with the incandescent traffic light ball illustrated in FIGURE 1 merely illustrates the problem the present application addresses. The lamps of Zhang FIGURES 3.1 and 4.1 have LEDs broadly distributed across the face of the lamp. These distributed LEDs are not compatible with a collimating reflector that collimates light emanating from a spatially localized focal point. Claim 1 addresses this problem using the partially reflective and partially transmissive optical element. Johnson does not disclose or fairly suggest such an optical element in which that portion of forwardly directed light passing through the optical element defines a direct light contribution to the light output.

Moreover, one skilled in the art would not be motivated by the references to make such a combination. Of course, the motivation to combine cannot be found in Applicants' own disclosure (MPEP § 2143); hence, it would have to be found in Zhang or Johnson. Zhang cannot provide the motivation, because the distributed LEDs of Zhang are designed to substitute for a collimating reflector of the traffic light ball; hence, Zhang teaches away from claim 1 by providing an alternative solution. Johnson relates to injecting light into a planar waveguide; it provides no motivation whatsoever to construct an LED based traffic light ball, much less motivation to construct the specific traffic light ball called for in claim 1.

New claims 26 and 27 are supported in the original specification at least at ¶[0034]. New claim 26 calls for a ratio of the light dispersed by the optical element to the direct light contribution to be selected to correspond to light output of a filament of an incandescent light bulb. New claim 27 calls for a ratio of the light dispersed by the optical element to the direct light contribution to be selected to approximate one of a point light source and a line light source. The cited references, alone or in combination, provide no teaching or fair suggestion of an optical element producing either such light output.

Accordingly, it is respectfully submitted that claim 1, and claims 2-5, 26 and 27 that depend therefrom, patentably distinguish over the references of record. Applicants therefore respectfully ask that claims 1-5, 26, and 27 be allowed.

Claims 6-9 Distinguish Over the References of Record

Claim 6 calls for a method for retrofitting a traffic light ball, including removing the threaded light bulb from the threaded socket and connecting a threaded LED light source into the threaded socket, wherein the threaded LED light source includes at least one light emitting diode (LED), and an optical element that conditions light produced by the at least one LED to approximate light produced by the incandescent filament of the threaded light bulb.

The cited references, alone or in combination, do not disclose or fairly suggest this retrofit method. While the light sources of Zhang may be suitable for retrofitting an incandescent traffic light ball with LEDs, they do so in an entirely different way from the method called for in claim 6. The light source of Zhang dispenses entirely with the optics of the traffic light ball, and instead distributes LEDs across the face of the traffic light ball. Zhang does not attempt to adapt LEDs to utilize the optics of the existing traffic light ball.

In contrast, claim 6 calls for the LED light source to have an optical element that conditions light produced by the at least one LED to approximate light produced by the incandescent filament of the threaded light bulb. This approach enables the retrofitted LED light source to work with the optics of the existing traffic ball.

Accordingly, it is respectfully submitted that claim 6, and claims 7-9 that depend therefrom, patentably distinguish over the references of record. Applicants therefore respectfully ask that claims 6-9 be allowed.

Claims 19-22 Distinguish Over the References of Record

Claim 19 stands rejected based on Applicants' FIGURE 1 in conjunction with Zhang. Applicants respectfully request reconsideration and withdrawal of this rejection.

In rejecting claim 19, the Office Action cites Zhang as disclosing a light dispersing element 2 dispersing forwardly directed light emanating from LEDs. While this statement is an accurate description of the diffused plastic cover 2 of Zhang, it is a very incomplete statement of what claim 19 calls for.

Claim 19 calls for a light dispersing element arranged at a focal region of a collimating reflector which intercepts and transforms the first light beam into dispersed light emanating from the focal region. The plastic cover 2 of Zhang extends across the entire face of the light source; it cannot be disposed at a focal region of a collimating reflector. Nor does the plastic cover 2 of Zhang intercept and transform a forwardly directed light beam into dispersed light emanating from such a focal region. Indeed, Zhang ¶[0092] says that the cover 2 can be either transparent or diffused. The lamp of Zhang is operative with a transparent cover. Apparently, a diffused cover produces some light scattering that reduces the otherwise non-uniform illumination provided by the widely distributed plurality of LEDs. There is no suggestion that such diffusion scatters light into an optical system that focuses it into an output light beam, as called for in claim 1.

Moreover, one skilled in the art would not be motivated by Zhang to make the proposed combination. Such motivation to combine cannot be found in Applicants' own disclosure (MPEP § 2143); hence, it must be found in Zhang, if at all. The Office Action asserts that Zhang teaches positioning the LED in the focal region of the lamp. While the Office Action does not say where in Zhang this arrangement is found, Zhang Fig. 5.2 appears to show such an arrangement. However, claim 19 does not call for such an arrangement. Claim 19 calls for arranging a light dispersing element in a focal region, and not an LED. Zhang provides no motivation to arrange a light dispersing element in a focal region.

Accordingly, it is respectfully submitted that claim 19, and claims 20-22 that depend therefrom, patentably distinguish over the references of record. Applicants therefore respectfully ask that claims 19-22 be allowed.

Claims 23-25 Distinguish Over the References of Record

Claim 23 relates to a lamp for use in a light producing apparatus having a socket and a collimating reflector that directs light outwardly from the light producing apparatus. The lamp includes a connector by which the lamp is installed in the socket, a plurality of LEDs electrically connected to the connector, and a redirection optical element arranged at about a focal position of the collimating reflector when the lamp connector is installed in the socket.

The redirection optical element is partially light-transmissive and partially light-reflective, and (i) partially reflects light emitted from the plurality of LEDs into the collimating reflector and (ii) partially transmits light emitted from the plurality of LEDs. The partially reflected light and the partially transmitted light together approximate one of a point light source and a line light source. This latter content added by amendment is supported in the original specification at least at ¶[0034].

Terlap discloses a reflective redirection element. Terlap does not disclose a partially reflective and partially transmissive redirection optical element. Moreover, Terlap does not disclose a redirection optical element in which the partially reflected light and the partially transmitted light together approximate one of a point light source and a line light source.

Zhang and Applicants' FIGURE 1, alone or in combination, do not remedy this deficiency of Terlap, because neither of these references disclose a partially light-transmissive and partially light-reflective redirection optical element.

Accordingly, it is respectfully submitted that claim **23**, and claims **24-25** that depend therefrom, patentably distinguish over the references of record. Applicants therefore respectfully ask that claims **23-25** be allowed.

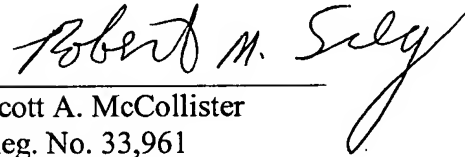
CONCLUSION

In view of the foregoing amendments and remarks, it is respectfully submitted that pending claims **1-9** and **19-27** are now fully in condition for allowance. Allowance of claims **1-9** and **19-27** is respectfully requested at the earliest possible date.

If any fee is due in conjunction with the filing of this Amendment, Applicants authorize deduction of that fee from Deposit Account No. 06-0308.

Respectfully submitted,

FAY, SHARPE, FAGAN,
MINNICH & McKEE, LLP

A handwritten signature in cursive script, reading "Robert M. Sieg". The signature is written in dark ink and is positioned above a horizontal line.

Scott A. McCollister

Reg. No. 33,961

Robert M. Sieg

Reg. No. 54,446

1100 Superior Avenue, Seventh Floor

Cleveland, OH 44114-2518

(216) 861-5582